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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,621	01/17/2002	Gang Herbert Lin	3123-297	3057

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EXAMINER	
BERNATZ, KEVIN M	
ART UNIT	PAPER NUMBER
1773	5

DATE MAILED: 06/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	10/052,621	LIN ET AL.	
	Examin r	Art Unit	
	Kevin M Bernatz	1773	

-- The MAILING DATE of this communication appears on the c ver sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 53-125 is/are pending in the application.

4a) Of the above claim(s) 79-81,103-105 and 123-125 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 53-78,82-102 and 106-122 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 53-125 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of species I, subspecies I in Paper No. 4 is acknowledged. The traversal is on the ground(s) that the species are related and neither separate nor distinct, specifically that "the magnetization-thickness product is directly related to the information layer thickness and the coercivity is directly related to the underlayer thickness" (*page 5 of response*). Upon further consideration and in view of applicants' arguments, the species restriction between species (a) – (i) on page 2 of the Office Action mailed April 16, 2003 (Paper No. 3) is withdrawn. The subspecies restriction requirement on page 3 of the Office Action mailed April 16, 2003 (Paper No. 3) is maintained and applicants' election is therefore considered to an election to prosecute all claims wherein "the variation is the radial direction is substantially linear". Applicants' arguments that the search is not a serious burden is not found persuasive since, while the search may be overlapping, there is no reason to believe the search would be coextensive. The requirement is still deemed proper and is therefore made FINAL. An action on claims 53 – 78, 82 – 102 and 106 – 122 follows:

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 62 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a magnetic moment of 0.2 – 1.0 memu/cm^2, does not reasonably provide enablement for a magnetic moment of 100 – 600 memu/cm^3. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 53 – 58, 63, 64, 66 – 68, 75 – 78, 82 – 86, 91, 92, 96, 99, 101, 102, 106 – 108, 113, 116, 118 and 119 are rejected under 35 U.S.C. 102(b) as being anticipated by Aida et al. (JP 06 – 215344 A). See provided JPO abstract translation and Machine assisted translation of JP '344 A.

Regarding claims 53 – 58, 63, 64, 66 – 68, 76, 77 and 78, applicants claim "a disk for information storage, comprising (a) a substrate, and (b) an information layer for

containing information, wherein at least one of the following conditions is true: (i) the disk has at least two recording parameters that vary radially outward, (ii) the information layer has a writing parameter that varies radially outward, (iii) an underlayer located between the substrate and the information layer has a thickness that varies radially outward to cause a recording parameter of the disk to vary radially outward, and (iv) the information layer has a thickness that increases progressively from an inner disk diameter to an outer disk diameter".

Aida et al. disclose a magnetic disk (*Machine Translation, Paragraph 0001*) comprising a recording film for containing information (*Paragraph 0002*), with a substrate, an underlayer and a magnetic layer (i.e. applicants' information layer) therein (*Paragraph 0009*). Aida et al. further disclose that the product of magnetic layer and the coercivity are adjusted to be constant at all radial positions (*Paragraphs 0011 and 0018*) by varying either the coercivity in a radial direction (*Paragraph 0024*) or the magnetic layer thickness in a radial direction (*Paragraph 0027 and Drawings 3 and 7*). Aida et al. also disclose that the underlayer thickness can be varied in a radial direction to control the coercivity (*Paragraph 0036*).

It has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on

prima facie obviousness under 35 USC 103, jointly or alternatively. Therefore, the *prime facie* case can be rebutted by ***evidence*** showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In the instant case, the claimed and prior art products are substantially identical in structure, specifically embodiments wherein the magnetic layer thickness varies radially outward (*Paragraph 0027 and Drawing 3*) or the underlayer thickness varies radially outward (*Paragraphs 0024 and 0036*).

Since all recording parameters and writing properties are a function of the interaction between the underlayer and the recording layer, as well as the recording layer thickness, the Examiner deems that all recording and writing properties would inherently vary radially outward since the magnetic layer thickness is taught to vary radially outward and/or the underlayer thickness is taught to vary radially outward. Furthermore, the Examiner notes that the relative direction which these properties vary versus thickness are inherent characteristics of the alloys: when the coercivity increases (*Paragraph 0027*) the magnetic remanence will decrease (*applicants' claims 57 and 107*).

Therefore, the Examiner deems that Aida et al. disclose an invention meeting all of applicants' claimed "conditions", since Aida et al. disclose embodiments wherein "(iii)

an underlayer located between the substrate and the information layer has a thickness that varies radially outward to cause a recording parameter of the disk to vary radially outward" (*decreasing from an inner disk diameter to an outer disk diameter; Paragraphs 0024, 0026 and 0036*) and "(iv) the information layer has a thickness that increases progressively from an inner disk diameter to an outer disk diameter" (*Paragraph 0027 and Drawing 3*). The limitations "(i) the disk has at least two recording parameters that vary radially outward" (*either Hc, which is taught to decrease as above, or all additional inherent "recording parameters"*) and "(ii) the information layer has a writing parameter that varies radially outward" (*either Hc, which is taught to decrease as above, or all additional inherent "writing parameters"*) would be inherently possessed by either embodiment for the reasons stated above.

Regarding claim 75, Aida et al. disclose NiP layers (*Paragraph 0027*).

Regarding claims 82 and 83, the reported areal recording density is a function of the track width and track density and is not a property solely of the media, per se, and therefore not further limiting in so far as the structure of the product is concerned.

Regarding claims 84 – 86, 91, 92, 96, 99, 101, 102, 106 – 108, 113, 116, 118 and 119, Aida et al. disclose varying the coercivity such that it meets the claimed limitation "the information layer has a first coercivity at a first inner radial location that is less than a second coercivity of the information layer at a second outer radial location" (*Paragraphs 0024 and 0030 and Drawing 7*), i.e. an opposite radial dependence than the above embodiments. The Examiner notes that this would result in a product which would inherently meet the limitations "the information layer has a first magnetic

remanence at a first inner location that is more than a second magnetic remanence of the information layer at a second outer radial location" and "the information layer has a first magnetic moment at a first inner location that is more than a second magnetic moment of the information layer at a second outer radial location" since the remanence and magnetic moment have an opposite dependence than the coercivity, as discussed above.

6. Claims 53 – 59, 63, 64, 66, 67, 75 – 78, 82, 83, 106 – 108, 111, 113 and 118 are rejected under 35 U.S.C. 102(b) as being anticipated by Bloomquist et al. (U.S. Patent No. 4,663,009).

Regarding claims 53 – 59, 63, 64, 66, 67, 76, 77 and 78, Bloomquist et al. disclose a magnetic disk (*col. 16, lines 3 - 17*) comprising a recording film for containing information (*col. 16, lines 35 - 38*), with a substrate, an underlayer and a magnetic layer (i.e. applicants' information layer) therein (*col. 1, lines 24 – 32 and col. 16, lines 35 - 42*). Bloomquist et al. further disclose that either or both of the magnetic layer composition, the coercivity, or the underlayer thickness are adjusted to vary in a radial direction (*col. 16, lines 27 – 31 and lines 35 – 38 and col. 20, lines 36 - 56*).

In the instant case, the claimed and prior art products are substantially identical in structure, specifically embodiments wherein the magnetic layer composition varies radially outward (*col. 16, lines 35 - 38*) or the underlayer thickness varies radially outward (*col. 20, lines 36 - 56*).

Since all recording parameters and writing properties are a function of the interaction between the underlayer and the recording layer, as well as the recording layer composition, the Examiner deems that all recording and writing properties would inherently vary radially outward since the magnetic layer composition is taught to vary radially outward and/or the underlayer thickness is taught to vary radially outward. Furthermore, the Examiner notes that the relative direction which these properties vary versus thickness are inherent characteristics of the alloys: when the coercivity increases (*col. 16, lines 27 - 31*) the magnetic remanence will decrease (*applicants' claims 57 and 107*).

Therefore, the Examiner deems that Bloomquist et al. disclose an invention meeting applicants' claimed "conditions" (i) – (iii), since Bloomquist et al. disclose embodiments wherein "(iii) an underlayer located between the substrate and the information layer has a thickness that varies radially outward to cause a recording parameter of the disk to vary radially outward" (*decreasing from an inner disk diameter to an outer disk diameter; col. 20, lines 54 - 56*) and an information layer which has a composition that varies radially outward. The limitations "(i) the disk has at least two recording parameters that vary radially outward" (*either Hc, which is taught to decrease from an inner disk diameter to an outer disk diameter at col. 16, lines 28 - 31, or all additional inherent "recording parameters"*) and "(ii) the information layer has a writing parameter that varies radially outward" (*either Hc, which is taught to decrease as above, or all additional inherent "writing parameters"*) would be inherently possessed by either embodiment for the reasons stated above.

Regarding claim 75, Bloomquist et al. disclose NiP layers (*col. 1, lines 24 - 32*).

Regarding claims 82 and 83, the reported areal recording density is a function of the track width and track density and is not a property solely of the media, per se, and therefore not further limiting in so far as the structure of the product is concerned.

Regarding claims 106 – 108, 111, 113 and 118, Bloomquist et al. disclose varying the coercivity such that it meets the claimed limitation "a first recording parameter of the information layer at a first radial location is higher than the first recording parameter at a second, different radial location" (*Hc, col. 16, lines 28 – 31*), which would result in a product which would inherently meet the limitations "a second recording parameter of the information layer at the first radial location is lower than the second recording parameter at the second radial location, wherein the first and second recording parameters are different from one another" for the reasons cited above.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 87, 94, 109 and 121 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida et al. as applied above.

Aida et al. is relied upon as described above.

Aida et al. fail to disclose the relative values of the magnetic moment and magnetic remanence between the inner and outer radius.

Aida et al. teach the importance of the magnetic recording and writing parameters, such as Hc, on the overall medium characteristics, such as signal-to-noise ratio (*Drawings*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the relative magnetic moment and magnetic remanence values through routine experimentation, especially given the teaching in Aida et al. regarding the desire to optimize the magnetic characteristics at the various radial locations. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

9. Claims 61, 88 and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida et al. as applied above, and further in view of Wu et al. (U.S. Patent No. 6,156,422).

Aida et al. is relied upon as described above.

Aida et al. fail to disclose a magnetic remanence meeting applicants' claimed memu/cm^3 limitation.

However, Wu et al. teach the importance of minimizing the Mrt, which can be achieved by either minimizing the Mr or the thickness values (*col. 4, lines 9 – 26; Table 1 and claims 11 and 12*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause

effective variable such as the magnetic remanence through routine experimentation, especially given the teaching in Wu et al. regarding the desire to minimize the Mrt value, and hence Mr value, to produce a high density recording medium with high anisotropy.

10. Claims 59, 89 and 111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida et al. as applied above, and further in view of Bloomquist et al. ('009).

Aida et al. is relied upon as described above.

Aida et al. fail to disclose varying the chemical composition of the magnetic layer in a radial direction.

However, varying the chemical composition of the magnetic layer is a known equivalent method to vary the magnetic properties of the magnetic layer, as evidenced by Bloomquist et al. (*col. 16, lines 32 - 42*).

Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, varying the alloy composition and varying the thickness of the magnetic layer or underlayer are equivalents in the field of methods to vary the magnetic properties of the magnetic layer. *In re Fount* 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *Graver Tank & Mfg. Co. Inc. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

11. Claims 60, 90 and 112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida et al. in view of Bloomquist et al. as applied above, and further in view of Murata et al. (JP 05-189738 A). See provided JPO Abstract translation of JP '738 A.

Aida et al. in view of Bloomquist et al. is relied upon as described above.

Neither Aida et al. nor Bloomquist disclose a CoCrPtTaB alloy meeting applicants' claimed composition limitations.

However, Murata et al. teach CoCrPtTaB alloys with high coercive force, increased recording density and less noise, wherein the composition possesses overlapping Co, Pt, Ta and B concentration values, as shown in Table 1, below (*Abstract*). Murata et al. further teach the effects of varying the various alloy components on the magnetic properties, including Cr concentrations meeting applicants' claimed limitations (*Figure 1 – 5, and especially Figure 3*).

Table 1: Comparison of claimed and disclosed CoCrPtTaB alloys

	Co	Cr	Pt	Ta	B
Claimed	~60 – 80	~0.5 – 5	~ 1 – 10	~0.5 – 5	~0.5 – 5
Murata et al.	~48 – 90.4	~8 – 20	~1 – 15	~0.1 – 8	~0.5 - 9

The Examiner notes that Murata et al. teach that the amount of each element can be varied to affect the magnetic properties in a CoCrPtTaB alloy (*Figures*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine an amount of each element, thereby meeting applicants' claimed

compositional limitations, by optimizing the results effective variable through routine experimentation.

12. Claims 65, 97, 98, 114 and 115 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida et al. as applied above, and further in view of Chang et al. (U.S. Patent App. No. 2002/0114978 A1).

Aida et al. is relied upon as described above.

Aida et al. fail to disclose coercivity and squareness values meeting applicants' claimed limitations.

However, Chang et al. teach the importance of having a high coercivity greater than 3000 Oe and a high squareness (*Paragraphs 0003 and 0005*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the coercivity and squareness through routine experimentation, especially given the teaching in Chang et al. regarding the importance of these parameters.

13. Claims 69 – 74, 93, 95, 100, 117, 120 and 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aida et al. as applied above, and further in view of Moroishi et al. (U.S. Patent No. 5,900,324).

Aida et al. is relied upon as described above.

Aida et al. fail to disclose the thickness of the information layer (claims 69, 93 and 120), the thickness of the non-magnetic underlayer (claims 100 and 117), a dual-

layered recording medium meeting applicants' claimed structural limitations (claims 70 – 74), nor the value of the magnetic moment, Mrt (claims 95 and 122).

However, Moroishi et al. teach that the claimed structural and thickness limitations are all old in the art when forming media possessing low noise (*Figures; col. 1, lines 31 – 46; col. 6, lines 56 – 65; col. 7, lines 1 – 14; and col. 9, lines 1 – 12*).

The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the magnetic layer and underlayer thickness values through routine experimentation, especially given the teaching in Moroishi et al. regarding the desired thickness values.

Regarding claims 95 and 122, Moroishi et al. teach the importance of optimizing the Mrt value to be near 1.0 (*Table 1 and col. 14, lines 50 - 54*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the magnetic moment, Mrt, through routine experimentation, especially given the teaching in Moroishi et al. regarding the desire to utilize a value near 1.0 to achieve improved magnetic characteristics.

14. Claims 68, 84 – 87, 89, 91, 92, 94, 96, 99, 101, 102, 109, 116, 119 and 121 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al. as applied above, and further in view of Aida et al. ('344 A).

Bloomquist et al. is relied upon as described above.

Bloomquist et al. fail to disclose the information layer having a thickness that varies radially (claims 68, 92 and 119). Bloomquist et al. further fail to disclose varying the coercivity such that it meets the claimed limitation "the information layer has a first coercivity at a first inner radial location that is less than a second coercivity of the information layer at a second outer radial location", i.e. an opposite radial dependence than the previous embodiments. The Examiner notes that this would result in a product which would inherently meet the limitations "the information layer has a first magnetic remanence at a first inner location that is more than a second magnetic remanence of the information layer at a second outer radial location" and "the information layer has a first magnetic moment at a first inner location that is more than a second magnetic moment of the information layer at a second outer radial location", since the magnetic moment and the magnetic remanence have an opposite dependency than the coercivity, as discussed above (claims 84 – 87, 89, 91, 92, 94, 96, 99, 101, 102 and 116). Finally, Bloomquist et al. fail to disclose the relative values of the magnetic moment and magnetic remanence between the inner and outer radius (claims 87, 94, 109 and 121).

Regarding the disclosure of an information layer having a thickness which varies radially (claims 68, 92 and 119), the Examiner notes that varying the thickness of the magnetic layer is a known equivalent method to vary the magnetic properties of the magnetic layer, as evidenced by Aida et al. (*Machine Translation, Paragraph 0027 and Drawing 3*). Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, varying the thickness of the

magnetic layer or underlayer and varying the alloy composition are equivalents in the field of methods to vary the magnetic properties of the magnetic layer.

Regarding the disclosure of the coercivity such that it meets the claimed limitation "the information layer has a first coercivity at a first inner radial location that is less than a second coercivity of the information layer at a second outer radial location", which would result in a product which would inherently meet the limitations "the information layer has a first magnetic remanence at a first inner location that is more than a second magnetic remanence of the information layer at a second outer radial location" and "the information layer has a first magnetic moment at a first inner location that is more than a second magnetic moment of the information layer at a second outer radial location" (claims 84 – 87, 89, 91, 92, 94, 96, 99, 101, 102 and 116), the Examiner notes that such a behavior of the coercivity and other inherent magnetic properties is a known equivalent method to control the magnetic properties at specific radial positions, as evidenced by Aida et al. (*Paragraphs 0024 and 0030; and Drawing 7*). Specifically Aida et al. states that one can vary the coercivity such that it either increases or decreases in an outward direction. Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, using a magnetic layer wherein the coercivity increases as the radius increases or decreases as the radius increases are equivalents in the field of methods to optimize the magnetic properties of the magnetic layer at specific radial positions.

Regarding the relative values of the magnetic moment and magnetic remanence (claims 87, 94, 109 and 121), Bloomquist et al. teach the importance of the magnetic

recording and writing parameters, such as Hc, on the overall medium characteristics, such as writing current and areal recording density (*col. 16, lines 3 – 31*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the relative magnetic moment and magnetic remanence values through routine experimentation, especially given the teaching in Bloomquist et al. regarding the desire to optimize the magnetic characteristics at the various radial locations.

15. Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al. as applied above, and further in view of Wu et al. ('422).

16. Claims 88 and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al. in view of Aida et al. as applied above, and further in view of Wu et al. ('422).

Bloomquist et al. and Bloomquist et al. in view of Aida et al. are relied upon as described above.

Neither Bloomquist et al. nor Aida et al. disclose a magnetic remanence meeting applicants' claimed memu/cm^3 limitation.

However, Wu et al. teach the importance of minimizing the Mrt, which can be achieved by either minimizing the Mr or the thickness values (*col. 4, lines 9 – 26; Table 1 and claims 11 and 12*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the magnetic remanence through routine experimentation,

especially given the teaching in Wu et al. regarding the desire to minimize the Mrt value, and hence Mr value, to produce a high density recording medium with high anisotropy.

17. Claims 60 and 112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al., and further in view of Murata et al. ('738 A).

18. Claim 90 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al., and further in view of Murata et al. ('738 A). See provided JPO Abstract translation of JP '738 A.

Bloomquist et al. and Bloomquist in view of Aida et al. are relied upon as described above.

Neither Aida et al. nor Bloomquist disclose a CoCrPtTaB alloy meeting applicants' claimed composition limitations.

However, Murata et al. teach CoCrPtTaB alloys with high coercive force, increased recording density and less noise, wherein the composition possesses overlapping Co, Pt, Ta and B concentration values, as shown in Table 1, above (*Abstract*). Murata et al. further teach the effects of varying the various alloy components on the magnetic properties, including Cr concentrations meeting applicants' claimed limitations (*Figure 1 – 5, and especially Figure 3*).

The Examiner notes that Murata et al. teach that the amount of each element can be varied to affect the magnetic properties in a CoCrPtTaB alloy (*Figures*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine an amount of each element, thereby meeting applicants' claimed

compositional limitations, by optimizing the results effective variable through routine experimentation.

19. Claims 65, 114 and 115 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al. as applied above, and further in view of Chang et al. ('978 A1).

20. Claims 97 and 98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al. in view of Aida et al. as applied above, and further in view of Chang et al. ('978 A1).

Bloomquist et al. and Bloomquist et al. in view of Aida et al. are relied upon as described above.

Neither Bloomquist et al. nor Aida et al. disclose coercivity and squareness values meeting applicants' claimed limitations.

However, Chang et al. teach the importance of having a high coercivity greater than 3000 Oe and a high squareness (*Paragraphs 0003 and 0005*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the coercivity and squareness through routine experimentation, especially given the teaching in Chang et al. regarding the importance of these parameters.

21. Claims 69 – 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al. as applied above, and further in view of Moroishi et al. ('324).

22. Claims 93, 95, 100, 117, 120 and 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomquist et al. in view of Aida et al. as applied above, and further in view of Moroishi et al. ('324).

Bloomquist et al. and Bloomquist et al. in view of Aida et al. are relied upon as described above.

Neither Bloomquist et al. nor Aida et al. disclose the thickness of the information layer (claims 69, 93 and 120), the thickness of the non-magnetic underlayer (claims 100 and 117), a dual-layered recording medium meeting applicants' claimed structural limitations (claims 70 – 74), nor the value of the magnetic moment, Mrt (claims 95 and 122).

However, Moroishi et al. teach that the claimed structural and thickness limitations are all old in the art when forming media possessing low noise (*Figures; col. 1, lines 31 – 46; col. 6, lines 56 – 65; col. 7, lines 1 – 14; and col. 9, lines 1 – 12*).

The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the magnetic layer and underlayer thickness values through routine experimentation, especially given the teaching in Moroishi et al. regarding the desired thickness values.

Regarding claims 95 and 122, Moroishi et al. teach the importance of optimizing the Mrt value to be near 1.0 (*Table 1 and col. 14, lines 50 - 54*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the magnetic moment, Mrt, through routine experimentation, especially given the teaching in Moroishi

et al. regarding the desire to utilize a value near 1.0 to achieve improved magnetic characteristics.

Examiner's Comments

23. Applicants refer to the magnetic remanence (M_r) and the magnetic moment (M_r * t) (*specification, page 4, lines 4 – 15*). Applicants have further given a range of magnetic remanence of 100 – 600 memu/cm^3 (*page 14, lines 4 – 19*), a range in thickness of 60 – 300 Å (0.0000006 – 0.000005 cm) (*page 15, lines 3 – 8*), and a range in magnetic moment of 0.2 – 1.0 memu/cm^2 (*page 14, line 20 bridging page 15, line 3*). However, the above ranges do ***not*** result in a way to obtain the claimed and described magnetic moment (0.2 – 1.0 memu/cm^2). See Table 2, below.

Table 2: Comparison of disclosed Mr, t and Mrt values

	Mr (memu/cm^3)	* thickness (cm)	= Mrt (memu/cm^2)	Disclosed range
Min.	100	0.0000006	0.00006	0.2
Max.	600	0.000003	0.0018	1.0

The Examiner notes that the apparent error could be from an incorrect Mr range, an incorrect thickness range, or both ranges being incorrect. Applicants are reminded that any amendment addressing this issue should avoid adding new matter, and must find support in the as-filed disclosure. The Examiner notes that the prior art appears to indicate that a Mr value of 100 – 600 memu/cm^3 is an extremely small value of the

magnetic remanence (*Chang et al. '978, Figure 6; Wu et al., Table 2; and Moroishi et al., Table 1*).

Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lal et al. (U.S. Patent No. 5,324,593) teach a magnetic recording disk wherein the magnetic layer thickness, an underlayer thickness, a magnetic remanence and a magnetic composition can all be varied (*entire disclosure*). Patel (U.S. Patent No. 4,522,848) teach a recording disk wherein the coercivity is varied radially (*underlined sections*). Satoh et al. (U.S. Patent No. 5,393,584) teach a spin-coated recording disk wherein the thickness of the magnetic layer can be varied radially (*underlined and boxed sections*). Sasaki (JP 60-101720-A) teach a recording disk wherein the thickness of the magnetic layer is increased radially (*JPO Abstract*). Nippon Elec. Co. (JP 58-062829-A) teach a recording disk wherein the coercivity varies radially (*Derwent Abstract*).

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (703) 308-1737. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

KMB
June 18, 2003

Paul Thibodeau
Supervisory Patent Examiner
Technology Center 1700